

The Canadian Entomologist.

VOL. XXXIX.

LONDON, SEPTEMBER, 1907.

No. 9.

STUDIES IN THE GENUS INCISALIA.

BY JOHN H. COOK, ALBANY, N. Y.

IV.—INCISALIA NIPHON.

(Continued from page 260.)

First Larval Instar.—The caterpillar just from its egg-shell has been carefully described by others, except under the microscope it appears to differ from newborn larvæ of *irus*, *augustus* and *Henrici* only in its slightly greater size and the darker colour. The differentiating character which I gave in a previous installment* has not borne the test of subsequent investigation. The statement there made, that in *niphon* the short bristles associated with the latero-dorsal series of hairs are black and comparatively conspicuous, was based on comparisons of the one living *niphon*, which I secured from an egg in 1906 with living and alcoholic material of the other species, and as the examination was made under the same microscope, with the compared caterpillars side by side on the same slide, it is hardly likely that I was guilty of an error of observation. However, the larvæ which hatched from eggs secured this spring (1907) were compared with living larvæ of *irus* and *augustus* in the same manner, and the notes taken read: "Latero-dorsal bristles not more conspicuous than in the other species, colour darker, rather anomalous, to naked eye and under a simple lens gray-green-yellow, as though the interior of the body were gray-green and showed through a transparent-yellow; with two-thirds objective the griseous appearance is lost, but the yellow is not so brilliant as that of the compared species. Otherwise as before noted.† No variation among 14 examined. Eggs from confined females, Lakewood, N. J., May 19th, 1907.

On the second or third day after birth the appearance of the larva begins to alter; the dorsal area shows two dull longitudinal stripes, and

*CANADIAN ENTOMOLOGIST, Vol. XXXVIII, No. 6 (June, 1906), p. 182.

†A complete set of newborn larvæ has been preserved, and a full discussion of the specific characters, with illustrations, will, it is hoped, be given in a second series of studies in the genus, dealing with the comparative anatomy of the various stages to follow these outlines of the life-histories.

the sides grow darker. For a time the colours are nondescript, but before the first skin is cast they have become definite and the design is declared. Dorsum rich brown, threaded by a faint lighter medio-dorsal line; on either side a moderately broad creamy-white stripe, extending from the second thoracic to the eighth abdominal segment, of about equal width to the fifth abdominal segment, tapering gradually and approaching each other posteriorly. These stripes include the latero-dorsal hairs, and are not interrupted by the incisures. Lateral areas brown, limited below by a narrower cream-coloured line along the top of the substigmatal fold, beginning at the second thoracic and continuous around the last abdominal segment. Ventral surface light green. Length awaiting first moult, 2.65 mm.; breadth at fourth abdominal segment, 1.01 mm. Duration of first stage five to seven days.

Second Stage.—At first not differing from preceding. After a day or two a change is observable in the shape of the larva, the segments which since birth have been nearly rounded above (the foveæ represented only as slight indentations) assume the complex fold, common in varying degrees to all Lycaenid larvæ. A little later a very faint, lighter brown spiracular line appears, extending from the third thoracic to the sixth abdominal segment, and interrupted by the incisures. Underneath the substigmatal fold the green is of a lighter tint at the base of each proleg. Length at rest for second moult, 6.1 mm. Duration of this stage six to eight days.

Third Stage.—No noticeable change, except in size, for several days. (Plate 9, fig. 1, larva \times 8.) Then the brown, which up to this time has been of the same shade in all the larvæ, begins to show some slight variations. Some individuals grow paler, the brown showing traces of yellow, others become darker, and in one case the brown assumed for about 24 hours a decidedly reddish cast. These alterations in the colour are preliminary to a much more striking change, and due probably to the decomposition of a pigment, which at this period in the life of the caterpillar is no longer of any use. At any rate, the brown weakens just as though a pigment were being removed by metabolic processes, and in a surprisingly short time it has quite disappeared, leaving the areas, which were formerly brown, deep pine-needle green. Concomitantly the creamy stripes become pure white, and the medio-dorsal and spiracular markings grow larger and better defined. Length when up for third moult, 9 mm. Duration of the stage five to seven days.

Fourth Stage.—During this instar the segments again fill out, reducing the folds and foveæ considerably, though they can still be made

out. There is no change in the colour or pattern, except that the medio-dorsal line becomes somewhat more prominent, and the spiracular line appears to cross the incisures. Length a day or two after the fourth moult, 14 mm.

Final Stage.—(Plate 9, figs. 2 and 3, mature larva \times 3.) Not differing from preceding stage, the general effect of the stripes being a striking example of protective coloration, alternate lines of white and pale green on a dark green background being well calculated to render the larva inconspicuous as it rests among the clustered pine-needles. During the last two instars the latero-dorsal white stripes become tinged with yellow, which may deepen to a decided orange. Unlike the congeneric caterpillars, the markings do not disappear as the time for pupation approaches. Length when feeding has stopped, 17 to 20 mm. Duration of fourth and fifth stages together, 10 to 18 days, at least two days being spent upon the final mat.

Length of Larval Life.—The shortest span from egg to chrysalis was 27 days 10 hours; the longest, 38 days; the average for 12 larvæ, 30 days.

Pupation.—The caterpillars seek the ground as the time for pupation approaches, and turn to chrysalids among the leaves.

The Chrysalis.—(Plate 9, fig. 4, dorsal aspect; fig. 5, lateral aspect \times 8.) I am unable to find any character which will serve to distinguish the chrysalis of *niphon* from that of *irus* or *augustus*. As a rule, it is very dark above, the wing-cases somewhat redder, the whole surface heavily sprinkled with black spots and irregular blotches, variable in size and arrangement, and affording no clue to the species of the enclosed insect. The "slender dorsal ridge" is a variable quantity sometimes present, but more often not.

TENTHREDINIDÆ OF COLORADO.

BY GEO. P. WELDON, COLLEGE PARK, MD.

Unlike most families of the Hymenoptera, the Tenthredinidæ are not highly specialized insects. They do not live in well-organized societies as do many of the bees, ants and wasps, but are solitary in their habits. In the case of the social Hymenoptera, we have a colony organization where different kinds of individuals are entrusted with different duties to perform. Such a high degree of specialization is manifest, that we observe with amazement and wonder the instinctive qualities displayed by them. Not so in the case of the Saw-flies: the only obligation resting upon these

little insects for the assurance of the perpetuation of the species, is in the deposition of the eggs upon some food-plant, where nature attends to the hatching, and the larvæ, guided by what we call instinct, look out for themselves.

The name Saw-flies was given to the Tenthredinidæ because of the shape of the ovipositor of the female, which resembles two minute saws placed side by side, and fitting into a groove underneath the abdomen, similar to the manner in which the blades of a knife fit into the handle. Not only do these weapons resemble a saw in shape, but they also serve the purpose of a saw, for the larvæ feed upon living vegetable tissue, the saws being used in making an incision for the reception of the egg.

In general, the Hymenoptera is a beneficial order of insects, but in it are also some pests of special economic importance, because of their destructive habits. Such pests belong to the Saw-fly family.

Though a few pests among them occur in Colorado, a far greater number are harmless, and never noticed in the adult stage, save by the entomologist or some other close observer of insect life. The genus *Tenthredo* contains the greatest number of Colorado species, none of which are of any special economic importance, but none the less interesting to the student of entomology.

Many species of Saw-flies have the gall-making habit, these galls being found on different species of willow, and are familiar objects to any one who has spent much time along the mountain streams of Colorado, where many species of willows grow in abundance, and are often very much disfigured by the presence of the little miniature houses of these gall-inhabiting species.

A special study was made of *Euura S. nodus*, a common species in Colorado, inhabiting galls occurring on *Salix longifolia*, and described by Mr. Benjamin D. Walsh as gall *S. nodus*. The following is his description of the gall, and is accurate for the Colorado specimens :

"*Gall S. nodus*, n. sp., on *Salix longifolia*. A mere gradual enlargement of a twig from one-fourth more than its normal diameter up to twice its normal diameter, almost always without any abnormal roughness on the external bark, and always not confined to one side of the twig. General colour that of the twig. When cut into August the 28th, the interior of each gall is found to be pithy, and to contain one to three larvæ in separate cells. Frequently on a piece of twig six inches long three or four of these galls are placed at irregular intervals. No appearance internally

of any transverse plates or fibres as in *S. ovum* and *S. ovulum*. Length, .75 to 1.5 inch; diameter, .10 to .25 inch. Very like the Cecidomyidous gall *S. nodulus* on the same willow (Proceedings of the Phila. Ent. Soc., Vol. 3, page 600), but is much larger, is polythalamous instead of monothalamous, and occurs near Rock Island, Ill., in quite a different locality. Analogous willow galls are made in Europe, not by a *Euura*, but by several small species of *Nematus*. (Westw., Introd. 2, p. 105.)"

Gall *S. nodus* is very common on *Salix longifolia* along the streams of northern Colorado. Mr. Walsh was familiar with the male of this insect, but knew nothing about the female. His description of the former is given in a comparative way with reference to *Euura S. ovum*. In my work with *Euura S. nodus*, a study was made of the winter and spring stages.

On the 6th of Jan., '06, a large number of galls were collected along the Big Thompson Creek, in the vicinity of Loveland. These galls were placed in breeding cages and kept in the laboratory of the Entomological Dept. of the Colo. Ag. College. A large number of galls were opened at this time, most of which contained larvæ, each one enclosed in a delicate cocoon, and from one to three in each gall, but usually not more than one. Both living and dead galls contained perfectly healthy larvæ. The first adult emerged on the 22nd of February. They then continued to emerge until the 6th of March, when the last of the lot made its appearance.

After the emergence of the first adult, a number of galls were cut open and examined for pupæ. This stage of the insect was not studied by Mr. Walsh, or not known by him at the time of his description of the adult. As found in the galls, their length varied from .25 to .30 of an inch.

Many more galls were collected and examined on the 4th of March. All galls which contained insects of the Tenthredinidæ family at all, contained them in the larval stage, showing that the unnatural conditions existing in the laboratory caused an early transformation from larvæ to adult of the previous lot. The first adult emerged from these galls on April 4th. There also emerged on this date a small Chalcid parasite.

On the 26th of March a great many galls were collected along the Poudre Creek, just on the outskirts of the City of Fort. Collins. On the 13th of April a couple of Ichneumon-fly parasites were found in the breeding cage, and on the 24th a large number of *Euura* began to emerge.

From all galls collected there were about an equal number of males and females which emerged. On May 1st I examined a large number of galls along the Poudre, and found at this time most of the flies had pupated; some few had already escaped, a few were still larvæ, and in one case an adult female was found in the gall, having just completed its transformation to the adult stage, and was ready to emerge.

It is interesting to note how the adult fly escapes from the gall, or rather how it makes provision for its escape. If galls are examined during the winter months many of them will be seen to contain a small round smooth hole, usually near one end. If these galls are opened, the larvæ will be found at the end of a burrow leading to this opening, but securely sealed from the outside by a plug, made from bits of wood chewed off by the larvæ in the process of making the hole. It is a wonderful instinct that guides these larvæ in making this hole, which the adult could not possibly make itself, and were not means for its escape from the cell prearranged by the larvæ, death would be the inevitable result.

While examining galls I noticed that there were many that did not have this hole by means of which the adult could escape, so proceeded to determine the cause for this condition of affairs. A large number of these galls were cut open, and not in a single case was a Euura larva found within. There was, however, in nearly all of these the larva of a little hymenopterous parasite belonging to the Chalcididae family. A number of these galls were placed in a breeding cage by themselves, where the little parasites soon emerged. The only explanation that I could give for this condition was : That this parasite had worked upon the Euura in the fall of the year, before the former had attained its growth and provided means for its escape as an adult the following spring by gnawing the usual hole in side of gall. The parasitized larva, being unable to withstand the attack of its little enemy, perished, whereas the destroyer lived in the gall in comfort throughout the winter months, and after completing its transformations in the spring escaped by means of a small hole made with its tiny strong mandibles. These little escape holes were plainly seen, freshly gnawed in many of the galls from which the little parasites were emerging.

Two Cecydomiid flies were also found in this breeding cage, but came from different galls, much resembling the others, but monothalamous instead of polythalamous.

Owing to the fact that Mr. Walsh's description of *Euura S. nodus* is given in a comparative way with reference to *Euura S. ovum*, a description of the latter is inserted here before the description of the former.

Imago.—*Euura S. ovum*, n. sp.—Shining honey-yellow. Head, with the eyes, a square spot enclosing the ocelli, but separated from the eyes by a pretty wide orbit, and also the tips of the mandibles, all black. Clypeus emarginate, in a circular arc of about 90 degrees. Labrum rounded at the tip. Occiput more or less clouded with black on the disk. Antennæ dull rufous above, with their basal one-half black, honey-yellow below, with the scape black, and more or less of the basal half of the flagellum dusky, three-fifths as long as the body, joints three to five subequal, four slightly the longest, five to eight very gradually becoming shorter, nine fully as long as eight. Thorax with an oblong spot on the anterior lobe of the mesonotum, generally extending from the collar two-thirds of the way to the hind angle of the lobe, rarely covering almost its entire surface; anterior disk of the mesonotum, and the edges of the basal plates that border on the basal membrane, or rarely the entire surface of the basal plate, all black. Cenchri whitish. A more or less black cloud on the pectus, and another on the posterior disk of the pleura, the former occasionally obsolete. Abdomen with that part of the anterior edge of joint one that borders the whitish basal membrane, or rarely the basal one half of joint one, black. Ovipositor honey-yellow, the tarsal claws dusky. Wings hyaline, veins black; those on the costa, as well as the basal one-half of the stigma, whitish or yellowish, the rest of the stigma dusky. Length of female .17 to .22 inch. Front wing of female .18 to .24 inch.

Euura S. ovum male differs from the normal female only as follows: First, the ground colour is greenish-white, not honey-yellow; second, the black spot enclosing the ocelli is larger, and is separated from the eyes only by a narrow orbit, and occasionally touches them for a small space; third, the occiput, except the orbit, is distinctly black; fourth, in the antennæ the pale colours are more dominant, and verge more or less on greenish-white, and the antennæ are three-fourths, not three-fifths, as long as the body; fifth, the thorax is black, except the tegulae, the superior margin of the collar, and the cenchri, which are all greenish-white; sixth, the abdomen is black above, greenish-white below, the lateral plates basally black, but terminally clouded with the pale colour. Basal membrane white. Seventh, the legs are greenish-white, sometimes, especially

the hind legs, more or less honey-yellow. In the hind legs, the base of the coxae, the extreme tips of the femora and the tarsi are more or less fuscous. Eighth, the veins on the costa are scarcely whitish, and only the extreme base of the stigma is whitish. Length of male .10 to .17 inch.

Description of *Euura S. nodus* as compared with *Euura S. ovum* (Walsh). "Imago.—*Euura S. nodus*, n. sp.—Male differs from male of *Euura S. ovum* as follows: First, the pale colour is bright honey-yellow, not greenish-white throughout; that is, both in antennæ, body and legs. Second, the black spot enclosing the ocelli is larger, and confluent with the eye for its entire length, leaving no orbit between them. Third, the venter dried is honey-yellow on the terminal three or four joints, and in the middle only of one or two more. Basal plates black, as in *Euura S. gemma*. When recent, the venter was noticed as being greenish, and the legs are pale fulvous. Fourth, the legs dried are honey-yellow, immaculate, except the extreme tarsal tips. Fifth, the basal one-half of the stigma is whitish, as in *Euura S. ovum*, female. Length, male .16 to .17 inch; front wing of male .17 to .18 inch. Two males, female unknown."

The following is a description of the females which I have reared in large numbers from the galls:

Euura S. nodus, female.—Shining honey-yellow. Length, .22 to .25 in. Head: Black spot enclosing the ocelli usually small, and not confluent with the eyes, palpi and tips of mandibles black, otherwise yellow. Antennæ: Last four joints of a more or less rufous tinge; basal joints black, 3rd, 4th and 5th joints subequal, very gradually shorter to tip, ninth joint probably a trifle longer than eighth. Thorax with an oblong spot extending from the collar two-thirds of the way to the hind angle of lobe of the mesonotum. Metathorax, also sometimes pleura and pectus, black. There is a great variation here, and sometimes pleura and pectus are entirely yellow. Basal plates black. Abdomen yellow, with the exception of the sheath of the ovipositor, and part of the first segment, which are black. Legs honey-yellow, with tarsal claws blackish. Wings hyaline, veins black except costal margin vein and base of stigma, which are whitish.

The general appearance of *Euura S. nodus* and *Euura S. ovum* are the same. The latter is, however, much smaller, and the females of a darker colour.

Quite a number of *Euura S. ovum* galls were collected, but only a very few brought to maturity any of the Saw-flies. In fact, very few of

them contained larvae at all, as they had been previously parasitized, consequently we were unable to make much of a study of this species, though their galls were quite common in certain localities.

In the study of *Euura S. nodus* we were unable to make a study of the egg stage. Eggs are, however, undoubtedly laid by the adult female about the time that the willows are leafing out in the spring. They are deposited in a slit made in the bark by means of the little saw-like ovipositor. As a result of the deposition of this egg within the twig, the characteristic gall is formed where the larvae live throughout the winter months, pupating in the spring. The adults make their escape by means of the hole gnawed in gall by the larvae before they ceased feeding for the winter. This, in general, is the life-history of the species.

The following list of species occurring in some of the more important genera of Colorado, though far from being complete, we trust will aid in the further study of this interesting family.

The references given do not in every case refer back to the publication in which the original description occurred, but wherever possible reference is made to some work commonly found in ordinary libraries.

The material at my disposal was that owned by the Entomological Dept. of the Colo. Ag. College. Those specimens which were seen and studied by me throughout the time of these investigations are marked with a star; other species did not occur in the collection, but are reported as occurring in the State by other writers on the Tenthredinidae.

Thanks are due Prof. Alex D. MacGillivray, of Cornell University, for helping in the determination of some of the material, also to Prof. C. P. Gillette, of the Colo. Ag. College, who kindly tendered the use of his collection and library, and under whose direction the work was carried out.

**Cimbex americana*, Leach, Proc. Ent. Soc. Phila., Vol. 1, p. 201.

* { *Trichiosoma triangulum*, Kirby, Fauna Bor. Am., Vol. 4, p. 254.
 { *Trichiosoma aleutiana*, Cress., Trans. Am. Ent. Soc., Vol. 8, p. 1.

* { *Zareia americana*, Trans. Am. Ent. Soc., Vol. 8, p. 1.
 { (*Abia americana*, Cresson.)

**Hylotoma clavicornis*, Fab., Trans. Am. Ent. Soc., Vol. 1, p. 66.

**Hylotoma McLeayi*, Leach, Trans. Am. Ent. Soc., Vol. 1, p. 64.

**Hylotoma rubiginosa*, Klug, Trans. Am. Ent. Soc., Vol. 1, p. 72.

**Hylotoma scapularis*, Klug, Trans. Am. Ent. Soc., Vol. 1, p. 67.

- * { *Didymia fusca*, Trans. Am. Ent. Soc., Vol. 1, p. 60.
* { *Hylotoma fusca*, Klug.)
Shizocera abdominalis, Norton, Proc. Phila. Ent. Soc., Vol. 4, p. 243.
Shizocera plumiger, Nor., Proc. Phila. Ent. Soc., Vol. 4, p. 242.
* *Shizocera tristis*, Cress., Trans. Am. Ent. Soc., Vol. 8, p. 52.
* *Lophyrus Gillettei*, MacGillivray.
* *Pristiphora idiota*, Norton, Trans. Am. Ent. Soc., Vol. 1, p. 77.
* *Euura minuata*, MacGillivray.
* *Euura Salicis nodus*, Proc. Phila. Ent. Soc., Vol. 6, p. 253.
* *Euura S. ovum*, Walsh, Proc. Phila. Ent. Soc., Vol. 6, p. 253.
* *Pteronus integer*, Say, Boston Jour. Nat. Hist., Vol. 1, p. 218.
* *Pteronus mendicus* (Nem. m.), Walsh, Proc. Ent. Soc. Phila., Vol. 6, 261.
* *Amauronematus californicus*, Mar., Rev. Nematids N. A., p. 85.
* *Amauronematus Coquilletti*, Mar., Ibidem, p. 84.
* *Amauronematus orbitalis*, Mar., Rev. Nem. of N. A., p. 80.
* *Amauronematus rapax* (Nem. r.), Cress., Trans. Am. Ent. Soc., Vol. 8,
p. 4.
* *Eriocampoides limacina*, Retzius, Trans. Ent. Soc. Lon. Pr., p. 35.
* *Hoplocampa bioculata*, MacGill.
* *Hoplocampa gentilis* (Sel. g.), Cress., Trans. Am. Ent. Soc., Vol. 8, p. 14.
* *Hoplocampa halcyon* (Sel. h.), Nor., Proc. Bos. Soc. N. H., Vol. 8,
p. 222.
Hoplocampa lenis (Sel. l.), Cress., Trans. Am. Ent. Soc., Vol. 8, p. 14.
* *Hoplocampa montana* (Sel. m.), Cress., Proc. Ent. Soc. Phila., Vol. 4,
p. 244.
Hoplocampa spissipes (Sel. s.), Cress., Trans. Am. Ent. Soc., Vol. 8,
p. 14.
* *Blennocampa parva* (Sel. p.), Cress., Trans. Am. Ent. Soc., Vol. 8, p. 12.
* *Blennocampa Gillettei*, n. sp.
* *Monophadnus barda* (Sel. barda), Nor., Trans. Am. Ent. Soc., Vol. 1,
p. 247.
* *Monophadnus irrogata* (Sel. i.), Cress., Trans. Am. Ent. Soc., Vol. 8,
p. 13.
Monophadnus scelestae (Sel. s.), Cress., Trans. Am. Ent. Soc., Vol. 8,
p. 14.
Selandria decolorata, Cresson, Trans. Am. Ent. Soc., Vol. 8, p. 15.
Selandria dubia, Cresson, Proc. Ent. Soc. Phila., Vol. 4, p. 244.
Selandria obscurata, Cresson, Trans. Am. Ent. Soc., Vol. 8, p. 15.
Selandria sodalis, Cresson, Trans. Am. Ent. Soc., Vol. 8, p. 14.

- **Strongylogaster rubripes*, Cress., Trans. Am. Ent. Soc., Vol. 8, p. 20.
**Strongylogaster rufocinctus*, Nor., Trans. Am. Ent. Soc., Vol. 2, p. 217.
Stronglogaster fidus, Cress., Trans. Am. Ent. Soc., Vol. 8, p. 19.
**Monostegia rosea* (Sel. r.), Nor., Trans. Am. Ent. Soc., Vol. 1, p. 254.
**Monostegia ignotus* (Sel. i.), Nor., Trans. Am. Ent. Soc., Vol. 1, p. 257.
**Emphytus Gillettei*.
**Emphytus maculatus*, Nor., Trans. Am. Ent. Soc., Vol. 1, p. 232.
**Emphytus mellipes*, Nor., Boston Soc. N. H., Vol. 8, p. 155.
**Emphytus coloradensis*, n. sp.
**Taxonus nigrisoma*, Nor., Boston Proc. N. H., Vol. 9, p. 119.
**Dolerus abdominalis*, Nor., Trans. Am. Ent. Soc., Vol. 1, p. 237.
**Dolerus aprilus*, Nor., Trans. Am. Ent. Soc., Vol. 1, p. 236.
**Dolerus arvensis*, Say, Trans. Am. Ent. Soc., Vol. 1, p. 235.
**Dolerus collaris*, Say, West. Quar. Report, Vol. 2, p. 72.
Dolerus coloradensis, Cress., Trans. Am. Ent. Soc., Vol. 8, p. 11.
**Dolerus sericeus*, Say, Trans. Am. Ent. Soc., Vol. 1, p. 235.
**Dolerus similis*, Nor., Proc. Boston Soc. Nat. His., Vol. 8, p. 153.
**Dolerus tejoniensis*, Nor., Proc. Bos. Soc. Nat. His., Vol. 8, p. 154.
**Dolerus unicolor*, Beauv., same as arvensis.
**Macrophyia trisyllaba*, Nor., Bos. Jour. Nat. His., Vol. 7, p. 238.
Macrophyia epinotus, Nor., Trans. Am. Ent. Soc.; Vol. 1, p. 268.
**Macrophyia flavicoxæ*, Nor., Bos. Jour. Nat. His., Vol. 7, p. 258.
**Macrophyia pulchella*, Klug (*Allantus flavolineatus*, Nor.), Bos. Jour. Nat. His., Vol. 7, p. 259.
Macrophyia tibiator, Nor., Proc. Ent. Soc. Phila., Vol. 3, p. 10.
**Tenthredopsis atroviolaceus*, Harris.
**Tenthredopsis Evansii*, Harris, CAN. ENT., Vol. 25, p. 61.
**Zaschizonyx albilineatus*.
**Allantus basilaris* (*Tenthredo b.*), Say, Trans. Am. Ent. Soc., Vol. 1, p. 261.
**Allantus interruptus*, Nor., Trans. Am. Ent. Soc., Vol. 1, p. 263.
Allantus occidaneus, Cress., Trans. Am. Ent. Soc., Vol. 8, p. 18.
**Allantus opimus*, Cress., Trans. Am. Ent. Soc., Vol. 8, p. 15.
**Allantus unicinctus*, Nor., Proc. Ent. Soc. Phila., Vol. 3, p. 9.
Tenthredo æqualis, MacGill, CAN. ENT., Vol. 27, p. 284.
Tenthredo addenda, Cress., Trans. Am. Ent. Soc., Vol. 8, p. 23.
Tenthredo bella, Cress., Trans. Am. Ent. Soc., Vol. 8, p. 21.
**Tenthredo erythromera*, Provancher, Addit. Faune Can. Hymen., p. 13.
**Tenthredo Evansii*, Harris, CAN. ENT., Vol. 25, p. 61.

- **Tenthredo ferrugineipes*, Cress., Trans. Am. Ent. Soc., Vol. 8, p. 22.
- **Tenthredo flavomarginis*, Nor., Trans. Am. Ent. Soc., Vol. 2, p. 238.
- **Tenthredo mimula*, Cress., Trans. Am. Ent. Soc., Vol. 8, p. 23.
- Tenthredo morosa*, Cress., Trans. Am. Ent. Soc. Vol. 8, p. 23.
- Tenthredo occidentalis*, Cress., Trans. Am. Ent. Soc., Vol. 8, p. 23.
- Tenthredo pallipunctus*, MacGill, CAN. ENT., Vol. 27, p. 282.
- **Tenthredo pectoralis*, Nor., Trans. Am. Ent. Soc., Vol. 2, p. 237.
- **Tenthredo pleuralis*, Cress., Proc. Ent. Soc. Phila., Vol. 4, p. 245.
- **Tenthredo rufipes*, Nor., Proc. Ent. Soc. Phila., Vol. 3, p. 15.
- Tenthredo sectilis*, Cress., Trans. Am. Ent. Soc., Vol. 8, p. 23.
- Tenthredo terminatus*, MacGill, CAN. ENT., Vol. 27, p. 283.
- Tenthredo semirufus*, Nor., Trans. Am. Ent. Soc., Vol. 2, p. 235.
- **Tenthredo variatus*, Nor., Proc. Ent. Soc. Phila., Vol. 3, p. 12.
- Tenthredo variegatus*, Nor., Trans. Am. Ent. Soc., Vol. 2, p. 233.
- **Tenthredo verticalis*, Say, Trans. Am. Ent. Soc., Vol. 2, p. 228.
- Tenthredo ventricus*, MacGill, CAN. ENT., Vol. 27, p. 284.
- **Tenthredo xanthus*, Nor., Proc. Ent. Soc. Phila., Vol. 3, p. 13.
- **Poecilosoma punctulata*, n. sp.

Descriptions of New Species.

Poecilosoma punctulata.—Colour black. Length .25 inch. Head narrow from back to front. Eyes set well apart. Abdomen long and extremely flat. In the type specimen it is somewhat concave on the dorsal surface. The base of each segment of the abdomen, except the last two, contains two dorsal white spots, one on each side of the surface, extending nearly half way to the joint in front, and close to the centre of the body. Wings are hyaline, with a beautiful violaceous tinge. Stigma and nervures black.

Emphytus coloradensis.—Colour black. Small species, being only .18 inch in length. Tips of mandibles red, and palpi white. Tibia of front legs, tip of femora, and first joint of tarsus, white, rest of fore legs black. Middle pair of legs have the tibia and femora partly white. Hind legs entirely black. Wings hyaline, nervures black. Lower two-thirds of stigma a lighter colour than upper third.

Blennocampa Gillettei.—Colour black. Length of body .18 inch, to tip of wings .25 inch. Head rounded. Tegulae white. Body short, contracted. All the legs agree in having the tip of femora and tibiae whitish, with the tarsi slightly darker in colour. Wings extend well beyond the tip of the abdomen. Slightly dusky, with beautiful violaceous tinge. Nervures black. Stigma wide, lower two-thirds of lighter colour than upper one-third.

DESCRIPTIONS OF NEW SPECIES OF CECIDOMYIDÆ.

BY WILLIAM BEUTENMULLER, NEW YORK.

Asphondylia solidaginis, sp. nov.—Male and female. Eyes black. Face and posterior portion of the head sordid-orange, with a few long black hairs. Neck orange. Thorax above slaty-brown, with short whitish hairs in the two longitudinal grooves, and with rather long brownish hairs along the sides. Scutellum slaty-brown. Sides of thorax dull orange, marked with black. Abdomen dull slaty-brown, sparsely covered with short appressed whitish hairs; junctions of segments dull orange; under side wholly dull orange with whitish hairs. Legs of female black, femora whitish basally, junctions of femora and tibæ narrowly white: first joint of tarsi pinkish-white. Legs of male paler than in the female, somewhat pinkish in certain lights, and with the white band on the junction of the femora and tibæ less distinct. Wings densely covered with blackish scales. Halteres dull orange, with brownish-black scales. Length of male, 2.50 to 2.75 mm.; of female, 2.50 to 3 mm. Expanse of male, 4.50 mm.; of female, 6 mm.

Gall.—Monothalamous. Pale green, rounded somewhat, blister-like, much broader than high, single, or two or three in a row coalescing. Inside it is white, and contains a large larval chamber. It is formed between two, three or four leaves fastened together, the gall protruding on the upper and under side of the leaves. Width, 2.50 to 3.50 mm.; height, 2 mm.

Habitat.—Fort Lee, New Jersey; Staten Island and Bronx Park, New York City; Valley of the Black Mts., North Carolina (W. B.); Ithaca, New York (J. G. Needham).

Very common in certain localities.

The gall is evidently formed in the young buds of the plant when the immature leaves are galled by the larva, and remain fastened together as the leaves develop and become mature. The gall becomes mature late in June and early in July. The larvae transform in the galls, and the flies emerge early in July. The gall is found on the Golden-rod (*Solidago serotina*), and it seems to be confined to this species of plant.

Cecidomyia lysimachiae, sp. nov.—Male and female. Eyes black; face and posterior portion of the head white. Antennæ brown. Thorax

deep brown above, with golden-brown hairs along the middle and at the sides to the base of the wings. Thorax at the sides and beneath semi-translucent, red. Scutellum red. Abdomen blood-red, with a very broad, brown band on each segment; sides and beneath blood-red, with a few pale scales. Wings blackish-hyaline. Legs fuscous above, pale brown beneath. Halteres reddish. Expanse, 3 mm.

Gall.—Bud-like, and composed of immature leaves drawn together. It is formed at the extreme summit of the plant.

Habitat.—Fort Lee, New Jersey; Bronx Park, New York City.

The eggs are deposited in the young buds of the Loosestrife (*Lysimachia quadrifolia*), causing them to remain aborted and fastened together. The flies emerge late in June. After the flies have emerged, the deformed leaves of the galled buds begin to expand.

Cecidomyia myricæ, sp. nov.—Male and female. Eyes dark brown; front semi-translucent, sordid white. Antennæ as long as the body, fuscous; first and second joints semi-translucent, white. Thorax dull brown, smooth, with two yellowish longitudinal lines on the dorsum; posterior portion and scutellum dull amber-yellow, sides of thorax dull amber-yellow marked with brown. Abdomen dull amber-yellow above and below, sparsely beset with brown hairs. Legs fuscous. Wings hyaline, with black scales. Halteres semi-translucent, yellowish. Length, .75 to 1 mm.

Habitat.—Carlstadt, New Jersey.

Bred Aug. 2nd to 5th from bud-galls on *Myrica cerifera*. The larvæ live in numbers in the buds of this plant, causing them to become deformed. The larvæ pupate in the ground.

Cecidomyia meibomiiifoliae, sp. nov.—Male and female. Eyes black. Thorax and abdomen pale orange, the latter somewhat darker dorsally. Antennæ and legs fuscous. Wings blackish, hyaline. Length, 1.25 to 1.50 mm.

Habitat.—Carlstadt, New Jersey.

The larvæ live in the buds of *Meibomia Canadense*, causing an arrest of growth of the leaves. Collected July 11th. Adults emerged July 20th to 25th. Larvæ pupate in the ground.

Cecidomyia verbena, sp. nov.—Male and female. Head and thorax pale semi-translucent, yellow. Eyes black. Antennæ fuscous, whitish at

the junctions of the segments, with long brown hairs in the male, simple in the female. Abdomen pale semi-translucent, orange or yellow; posterior portions of the segments with rather long concolorous hairs directed backward. Legs pale yellow. Wings yellowish, hyaline. Length, 1 to 1.25 mm.

Habitat.—Bronx Park, New York City; Fort Lee, New Jersey.

The larvae of this species live in numbers between the unexpanded young leaves of the common white or Nettle-leaved Vervain (*Verbena urticifolia*), causing them to become deformed and twisted. Collected July 8th to 10th. The flies emerged from July 15th to 25th. The larvae transform in the ground.

DISASTROUS FIRE AT NEWARK, N. J.

The headquarters of the Newark Entomological Society, on the fourth floor of the Newark Turn Hall, were completely destroyed by fire in the early morning of June 3rd, 1907. The conflagration demolished not only the entire building, but also resulted in the loss of three lives.

The property of the Society consisted of a forty-drawer cabinet, containing 1,000 specimens of Lepidoptera and 2,500 specimens of Coleoptera, mostly representing local forms, besides a small collection in other orders; also a book-case with 110 bound volumes and 365 unbound volumes and pamphlets. All of this property was consumed by the flames, except a few books that were in the hands of members. This collection of publications and insects was the accumulation of over 20 years of the Society's existence, and as the loss was only partially covered by insurance it will be a long time before it can be replaced. Some of the books, perhaps, can never be obtained again.

The Society will be exceedingly grateful for any help in the way of restoring the library that may be given it. Entomologists are earnestly invited to send separates of their papers or other publications that they may have in duplicate, for which the cost of transmission will be gladly refunded. Until the Society is again established in permanent quarters, parcels should be addressed to the secretary at New Brunswick, New Jersey.

JOHN A. GROSSBECK, Secretary.

TWO NEW SPECIES OF TENTHREDINOIDEA.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

The following descriptions are offered so as to make it possible to refer to the species by name in descriptive papers.

Pamphilus persicum, n. sp.—Female.—Body black, with the following parts yellow: the labrum and clypeus broadly, the posterior orbits, the front orbits with a band extending to the occiput, with two tooth-like projections on the mesal side near the eye, a pair of lunate marks behind the ocelli, a small spot on the hypoclypeal area, the palpi, the V-spot, the tegulae and base of the wings, the scutellum, the postscutellum, a small irregular spot on the pleura, and the legs, except the extreme bases of the coxae, becoming rufous beyond the middle of the tibiae; mandibles and abdomen rufous; antennæ with thirty segments, the third and fourth subequal in length. Length, 10 mm.

Habitat.—Yalesville, Connecticut. Collected by Mr. B. H. Walden, on peach, 14th June, 1906.

Hylotoma spiculata, n. sp.—Female.—Rufous, with the following parts black: apical half of the mandibles, apical half of the suture extending from the antennæ to the mandibles, a minute spot above the base of the antennæ, the apical third of the antennæ, the prothorax, except the apex of the pronotum, the middle of the median lobe, a spot on the lateral lobes at the base of the wings, the metathorax, the pectus, the sides of the basal plates, a broad band on the sides of the five basal abdominal segments, with a narrow line extending along the posterior dorsal and the posterior ventral margins of the segments, the ventral half of the saw-guides, the coxae, the trochanters, the apical half of the femora, a broad band on the front wings from the medio-cubital cross-vein to the apex of the wing, except the stigma and a narrow arca beneath it; a triangular spot in the third median cell, a spot covering the cubital and anal area, and the apex of the hind wings; the tentorial invagination of the front distinct, two and one-half times as long as broad; posterior tibiae with a single middle spur; claws simple; antennæ, apex of the abdomen, apex of the legs, and wings yellowish. Length, 13 mm.

Male.—Entirely bluish-black, except the anal and cubital areas of the front wings and the basal half of the hind wings. Length, 12 mm.

Habitat.—Oak Creek Canon, New Mexico, 6,000 ft., August; F. H. Snow, collector.

September, 1907

NEW HISTORIES AND SPECIES IN PAPAIPEMA (HYDRŒCIA).

BY HENRY BIRD, RYE, N. Y.

(Continued from page 276.)

Few will appreciate better than the author that the working out of life-histories in this genus is a greater contribution to entomological knowledge than the mere description of new forms. One gets quite a different idea as to what is truly representative from breeding the various species than from the random imago that is occasionally captured. These moths are unusually secretive, their flight and life being very short normally, so that their appearance in cabinets is rare compared to their number in nature. For example, *cerussata* is commoner, locally, than *nitela*, yet the former appears in a short interval, while the latter's emergence is for a lengthy, protracted period, and it is on the wing during the whole of September and October. So one will take at light fifty of *nitela* to one *cerussata* per season. With species having a concentrated appearance there is good evidence that a female never spreads her wings unfertilized, and it is known that their life after oviposition, which consumes three or four days at most, is hardly longer. It is a fact, too, with many specimens in collections which were taken in flight, that we find them undersized and ill-marked, being examples whose emergence was protracted past the normal date, or whose larvae left their original burrows and completed their transformation in a more or less starved condition, and they little show what the species really should be like. A good illustration occurs with *eupatorii*, the few undersized specimens which happened to be in collections were identified as *nelita*. So soon as the former is bred and a representative specimen comes to hand, no one for a moment would assign it to any previously-described form. And even with *nelita*, it has remained for breeding to definitely settle its identification.

These arguments are advanced to show cause for still another name, indicative of a species very widely distributed and which has been under observation in its early stages for seven years, and which finds in *Pteris aquilina* a plant commensurate to all its desires. So close, however, does it come to *Harrisii* as larva, and to *purpurifascia* as imago, with a balance of suggestion pointing to the former species, that to raise it to specific rank appeared superfluous. Yet efforts to prove it a variety fail, and the evidence in the field offers not the remotest clue to that end. The slight discrepancy from *Harrisii* seemed easily attributable to the difference in food-plant, and the question was closely studied. The latter

September, 1907

chooses *Heracleum lanatum*, which is pungent, juicy and of rank growth, quite as opposite to the dry, stringy fern-stem as one could well imagine. *Heracleum* grows in great perennial clusters in many places at Rye, some having been undisturbed for a quarter of a century and never burned over. Even with such ideal conditions, and in a search that has gone on regularly for twelve years to detect the borings of *Harrisii*, there has never once appeared a *Papaipema* larva working in it, nor has this species occurred from any other local source. In practically the same locations *Pteris* grows abundantly, each year tenanted by goodly colonies of its particular form. Evidently, at the present time there is no change of food-plant. So the experiment of introducing the fern-borers at various stages to a *Heracleum* diet, which is easy in its hollow stalk, was repeatedly made, and always with negative results. Cross-breeding was not attempted for lack of material, and such artificial resorts hardly confirm natural conditions. While this diagnosis of appetite is not to be considered of value specifically, there are features in the generalized larva which point to this form being the stem of the various yellow species, certainly its taste for a Cryptogam might have been brought down from those remote ages of the past, that are clothed in the Cenozoic haze we would so gladly pierce. Finding ourselves, then, in contact with this representative form, whose history and anatomy must have an important bearing in a study of the phylogeny of the genus, we ask to be allowed to introduce still another aristocrat.

Papaipema pterisii, n. sp.—Form and habits typical; ground colour yellow. Primaries show the usual markings and contrasts. T. p. line bends but little, its geminate form hardly discernible, the outside one a purple fascia, though in many specimens it might not be regarded as such. Reniform broken, partly concolorous, only the two inner sections white-marked. The orbicular and claviform offer the best superficial character, the latter is not divided; orbicular irregularly quadrate, and its attachment to the upper part of claviform produces a conspicuous, brightly-white blotch or bar, longer than the reniform. Secondaries lighter, clouded at the margin. The discal spot is not noticed from above. The male structures are fitly representative of the typical form. They differ from *verona*, though not perceptibly from *Harrisii* or *purpurifascia*. Expanse, 31-32 mm.; 1.25 in. Three specimens furnished the description. A co-type will be placed in the National Museum.

The species is less highly coloured than *purpurifascia*, from which its larva separates it, and the slight differences in moth and larva remove it sufficiently from the other ally.

May 25th to 28th find the young larvæ hatching from the hibernated eggs. They enter the stem a few inches above the ground, and work down to the natural enlargement of the stalk that occurs in all plants, whether infested or not, just below the ground-level. At the same date the plant is attacked above by a Micro, in the petiole of the unrolling frond. Both often choose the same plant, though their combined efforts produce little retardation. A very limited gallery is made by *pterisi*, for the plant is inadequate for extended mining, the larva eats less, and is the most lethargic of any known. To the fourth moult the larva shows no individuality, except that it belongs to the group having the white dorsal line alone continuous and unbroken. Stage V: Colour dull wine-red, lines white, dorsal continuous. No accessory tubercle IV_a, the true IV low down in the generalized Noctuid position. All tubercles small and ill-defined. Head wider than shield. Stage VI: Head 2.1 mm. wide, still narrower than shield, and shield small. Colour is much faded. Tubercles same as before, neither IV nor V on joint ten bear setæ. Stage VII: Head 2.4 mm. wide, normal. All lines and colours lost in a soiled translucence. The larva now typifies a primitive, generalized form of that section which has in its early stages the continuous dorsal line, not acquiring any special accessory and protecting tubercle plate at the spiracle on joint ten. Of its allies, *purpurifascia* has acquired a large plate here, and *Harrisii* a very minute one. All tubercles weak, though black marked; normal. Length, 37 mm. Pupation occurs in the last days of July, the plant being deserted, and the moths come forth August 21st to 31st.

Probably no other species suffers to quite such an extent from regular yearly parasitism. Though it is so common and is represented in most collections, the acquisition of a good series is no easy matter. The plant is obdurate for breed-cage experiments, and maturity in the field finds them stung, and doubly stung. So fierce is this struggle and so numerous are the persecutors that it seems natural selection could never play much importance in any unbroken line; nor is it seen how such mutants as might arise were able to perpetuate a new character. But even the last few centuries must have surrounded our Lepidoptera with greatly changed conditions, and we are little able to speculate conclusively.

Papaipema (Gortyna) eupatorii, Lyman — This newly-described species was encountered in the larval state in the New Brighton section, establishing the fact, that, like most other species, it is widely disseminated. It is quite distinctive in both moth and larva, being easy of recognition, especially as the food plant does not seem to be popular with many other species, and it is certainly one of the nice things recently exploited. The larva has the happy trait of pupating in the food-plant, thus offering an extended period for securing it. Were parasites less destructive it would be easiest to let them thus remain and simply gather the pupæ. But *Eupatorium* is an ungainly plant to transport, and if left to mature afield but a very small percentage remain unaffected, hence it is not so easy to get it in numbers as some other species. An exit aperture, similar to the work of *imperturbata*, is made, for the stem rarely falls so as to be broken off, and the larva is careful to plug the great hollow stalk with dried bits above, so the moth must use the door, and not make the mistake of crawling up the interior.

The following will sufficiently characterize the larva, which has not been described : Head 2 mm. wide, rather small for the stage and size of larva ; yellow and shining, as is the shield. Mouth-parts and ocelli only are black. Body tapers both anteriorly and posteriorly slightly ; colour pale dull sienna. Lines are wide, pale cream colour, indistinct for the stage, none seem to cross the first four abdominal segments. An earlier stage might prove the dorsal to be continuous, but there is so little contrast at present it cannot be made out. Tubercles are very weak and concolorous, though III and IV can be made out, except on joint ten, where III, directly above the spiracle, is a minute dot. On this joint IV is transparent and normal ; there is no accessory IVa above it. Spiracles very small, the merest dots, but are black, as is usual. Anal plates small. Length, 35 mm.

Mature larva : As before, except that the shade is a creamy-white. The body is very perceptibly thickened centrally. No change in plates. A primitive larva that one would hardly think belonged to this genus at first glance. Length, 37 mm.

The pupal change occurs in the first days of August, and the pupa is more cylindrical and less tapering than its close allies. On the front is a very slight ridge, though this is not toothed as in *neopina*. One specimen only had the very faintest spur. The anal extremity is comparatively blunt. Moths emerge September 20th to 28th. The male structures

show some individuality compared with its allies. The harpes are less forked, obtusely rounded above, the outer margin nearly straight to the lower lobe, which is there sharply angled, but the usual slender, tooth-like projection does not occur.

Papaipema nelita, Strecker.—The exact standing and determination of this species had not been clear to the minds of all, especially the writer, so when the larva and early habit came to light there was much satisfaction experienced. After two seasons' acquaintance it is still of much interest, being very coy in the matter of supplying imagoes, a total of three for the two years is really the worst ever experienced. These poor returns were due to its maturing at an unexpectedly early date, and the enemies that prey are legion. Upon the first appearance of the moth it was identified as Strecker's species from the description, and later this was confirmed by an examination of his types. *Aerata*, described by Lyman as a new form in 1901, was soon afterward placed by its author as a synonym of this species. It can hardly be *nelita*, however, and is likely valid, certainly if the larva is as he mentions in the meagre note, stating that the usual longitudinal lines are all continuous. Only two other species possess this feature—*cataphracta* and *duovata*—and we know the larvae of all other known mouse-gray species. As the food-plant he mentions is Burdock, his find was evidently a case of substitution, for the species is not taken commonly from that source, even in the type locality, and as this plant is very generally bored by *cataphracta* the question may be open to possible error.

Rudbeckia laciniata is the plant chosen by *nelita*, and judging by its numbers in Western Pennsylvania and the wide distribution of the plant, it must occur very generally through the Middle States, though perhaps not crossing the Alleghanies in such numbers, for it has not so far been detected in Westchester County, N. Y. Work is carried on at the foot of the large stems, getting below ground at maturity, and an oval swelling is produced, which strengthens the stem sufficiently to keep erect. The commodious cell thus formed is forsaken, however, for the pupal change, though why such snug quarters do not appeal to this species, when all the rest of the superficially-allied ones change in their burrows, is not apparent. Working in conjunction with *nelita* at the base of *Rudbeckia* is the larva of the recently-described *Hysterosia Birdana*, Busck, which shares in the imago the pretty purplish-brown colours of its partner. A more than usual affinity appears to exist between the two, the galls tenanted by *nelita*

very often have the walls mined by *Birdana*, and it may be that these swellings are more spongy and tender than the bases of unaffected plants. Pupation is reached by the latter before *nelita* larvae are quite mature, and its appearance is correspondingly sooner. Busck's type was inadvertently labelled "bred from *Helianthus*," which is here corrected.

Nelita larvae were found in the last two stages, and it proved to belong to the section possessing the continuous dorsal line. All inflate at maturity shows some individuality, and its description is as follows: Head normal and agreeing with allies; 2.4 mm. in width. Shield wider than head, though its length, dorsally, is less than usual. All tubercles defined with black plates, the usual discrepancy in the size of some is not apparent. For instance, I is comparable to IV in point of size on all abdominal segments, a feature which rarely happens; in fact, all are very similar, except IIIa, which is normally small, and lies very close to the spiracle at its upper anterior corner. The abdominal leg plates are equally evident and bear three setae. On joint ten IV is normally placed low down, with no accessory plate above at the upper posterior side of the spiracle. The latter are black. The anal shield is comparatively small, the two dorsal plates preceding on this joint are not merged with it, or with each other. The body tapers at each extremity; its colour is white, all lines lost, the semi-translucence less livid than in many others. Length, 35 mm.

Maturity occurs July 15th to 20th, and the pupa is formed under a slight depth of soil or moss. It is a very ordinary, normal pupa, no development at the clypeal region, its colour darker and less shining than any species here described. Length, 17 mm. Dates of emergence, September 1st to 15th.

Papaipema frigida, Smith.—The description of the species *thalictri*, Lyman, and its so-called variety, *perobsoleta*, in this magazine for September, 1905, drew attention to the Meadow Rue as being a preferred food-plant in its case, where our own experience had only heretofore encountered *cataphracta* working in this plant. The western Pennsylvania fauna was found to be prolific of the species, and due search finally disclosed it in the home locality. In the series bred all are those having white-marked stigmata, and their resemblance to *cerussata* is striking for a species whose larvae differ so obviously, and it is likely that flown examples of one could easily be mistaken for the other. This reflection leads to another, presenting a question that dates back to the Revision of

Hydroecia in 1899, by Prof. J. B. Smith. At that time material was comparatively scarce and the larval histories mostly unknown, but it has been a matter of satisfaction that subsequent breeding and larval studies have been confirmatory of the new features there advanced. There was, however, one question, one oversight apparently that never could be fathomed.

Illustrations in the Revision were of male structures only, and one, fig. 25, on plate II, presumed to represent *cerussata*, was found to be in error. *Cerussata* had later become plentiful through the discovery of its larvae, and the genitalia were duly examined to note the "break" occurring with it, as chronicled in that publication. But it was found to be entirely typical, well represented by such a large structure as is shown at fig. 23. Prof. Smith went over it again, and agrees that there has been some oversight, that he must have figured some other which he mistook for the Grote species.

But what? This was a frequently-recurring question, and its elucidation seemed remote indeed. So the suggestion that *thalictri* may be this mistaken species finds confirmation in an examination of these structures, and it seems that fig. 25 is no error in itself, only it is wrongly labelled.

This conclusion naturally leads to another view-point, from which we now see *thalictri* in a new light. Among the larvae of this species a few have produced, in rearing, a form in which the stigmata are concolorous with its general tone, and which has been characterized under the varietal name *perobsoleta*. This feature of instability in the coloration of the stigmata is common to a number of species, and when series are not sufficiently complete to show gradations, there is quite a superficial difference in the appearance of the extremes by reason of contrast. Now fig. 25 of the plute in question (*thalictri*) is almost identical with fig. 26, representative of *frigida*. And what do we find to separate the latter from the form with concolorous stigmata? Nothing in the description and nothing in the types, except the usual difference between flown and bred material. It would then appear that *thalictri*, Lyman, 1905, will fall to *frigida*, Smith, 1899, at which earlier date the form having concolorous stigmata was described. There naturally arises the question at the meeting of species showing two superficial forms in the colour scheme, which is typical and which is varietal, especially in a case where it is deemed wise to name both. The prevalence of one against the fewness

of the other usually determine this, though a few chance meetings should hardly settle the matter. There are other arguments that may with propriety be considered.

Variety ought hardly to apply to the stem species, the primitive stock, even though it may have waned in numbers, giving way to later development, in whatever direction this may occur. That in *frigida* (*perobsoleta*) we really see represented a stem species, and in those having the spots white, a later specialized and varying form, is most probable. The general Noctuid phylogeny would point in this direction and the larvae also bear it out. *Frigida* larvae are the most generalized of any species, a direct opposite to *cerussata*, which is the most specialized. *Limpida* larvae should certainly fall between the two, notwithstanding the similarity in the imagoes of the first two species. Had Prof. Smith noticed the genitalic differences in the valid *cerussata* from his figure 25, and given specific distinction, when he failed to see differences in the aggregation of flown examples at hand for study, and had these larvae remained unknown, such discrimination would have received the disapproval of hair-splitting—a basing of species on genitalia alone. So, a varietal term for the white marked *frigida* may await further developments, the intergrades will likely appear, and if we are to name the extremes, *speciosissima*, *Harrisii*, *inquesita* and *purpurifascia* at once stand ready with variations to swell the list. What this *frigida* development does convey is the need for close scrutiny from all sides, the importance of working out life-histories and larval comparisons, the very striking value, in this case, of structural studies. And this is no criticism, but an excuse, whereby we show that it is worth while to continue a search through a decade or more, in running down these wily borers.

It may be complained, however, that descriptions of these closely-allied moths should not be attempted without figures; we often hear such a complaint at any rate. But with this group there are things more important than figures, more important than types. How many of the latter, especially with these moths, will be of use for comparison a century hence? Certainly none in private collections. Then there is the label, that thing apart; oh, the heartburnings from a transposed label! As to figures, he must be an expert indeed who can determine all the species from figures, and a figure only represents one individual.

We need more than this. We get it the moment a life-history is published, giving food-plant and general biological data. From this point

it is an open book to all, those who feel interest may peruse, those who can discriminate always find the bookmark in place. For a large page and bold type try *pterisii*—from Ottawa to Washington, the central plains to the seaboard—that yellow, sickly, brake frond on any hillside, a conspicuous feature of the landscape when attention is called to it; date July 15th.

How clearly the light has shone over Harris's species *leucostigma* by reason of the food-plant being mentioned. His name fell through pre-occupancy in the European fauna, but we could never have known what species he meant from even the good description, had that been all. Grote, at various times, placed it in the synonymy of three different species and redescribed it under a fourth. That *purpurifascia*, the universal Columbine feeder, was Harris's species we know beyond question, since that good man mentioned that its larva had feasted on the roots of a fine double Columbine in his garden. His description of one hundred and twenty words might have been cut in twain; his type—it has probably gone where all good types will ultimately go. Life-histories were generally unknown in Grote's time, and though now slowly giving up their secrets, there is great need for co-operation, especially from the West.

NEW TROPICAL AMERICAN HESPERIDÆ.

BY GEO. A. EHRMANN, PITTSBURGH, PENNA.

Leucochitonea Jason, n. sp.—This species is very closely allied to *L. locutia* of Hew., but it is not so robust in build. The colour of the head, thorax and abdomen is paler. Ground colour of the upper side of both pair of wings has a tendency to being semitransparent; basal area is not so dark. Outer margin is lightly shaded with pale brown; in this shaded space on the hind wings is a marginal row of whitish lunate spots. Fringes on the hind wings are white, on the fore wings black.

Under side: palpi, legs and abdomen white; thorax dark brown. The markings on the under side of all the wings are the same as above, but much paler. I find no special distinction in the markings in the sexes for separate description.

Exp. 2 inches. Types in cabinet of Ehrmann. Hab.: Suapure, Venezuela.

September, 1907

Leucochitonea Janice, n. sp.—Male: upper side, head, palpi and antennæ black; thorax black with a coat of long whitish hair-like scales. The abdomen is white with a brownish cast. Fore wings pure white, costal margin black, the apical and other margins are black; in the apical area there is a white dash running from costa to outer margin; fringes black. Hind wings pure white with a narrow black thread-like margin; fringes white.

Under side: thorax black, with a conspicuous white spot at the base of the fore wings, and a smaller reddish spot at the base of the hind wings. The abdomen is pure white, with two black lateral bars running its full length. Legs black. The fore wings are the same as above, but much lighter. Hind wings white, with a slight cast of brown scales. All the nervures are dark brown.

Exp. $1\frac{7}{8}$ inches. Type in cabinet of Ehrmann. Habitat: Suapure, Venezuela. Note—The species that is most closely allied to *L. Janice* is *L. pastor* of Feld. from Mexico.

Leucochitonea Euphemie, n. sp.—Allied to *L. canescens* of Felder from Mexico; the thorax is more robust; the abdomen is more decidedly annulated with lighter gray and the antennæ are heavier and longer. Fore wings on the upper side: The subapical and median row of spots are more decidedly outlined and not so large and confluent as in *L. canescens*. Hind wings on the upper side: The discoidal space is more broken into smaller and irregular shaped spots; there is also a row of six small pin-point spots on the outer margin. Fringes are heavier and paler. The under side of fore wings is the same as above, but lighter.

Hind wings on the under side are pure white, with a narrow disrupted black border. Under side: palpi, thorax, legs and abdomen pure white.

Exp. $1\frac{5}{8}$ inches. Types in cabinet of Ehrmann. Hab.: Suapure, Venezuela.

Pamphila Antenora, n. sp.—Upper side: antennæ and palpi dark brown; head dark brown, with two rows of three small white spots; thorax and abdomen dark brown. Upper side of fore wings, ground colour dark brown; at the extreme end of the discoidal there is a kidney-shaped transparent spot one-sixteenth of an inch in size; in the limbal inner space near the lower median nervure there is a square elongate transparent spot; above this on the median nervure there is another spot that is transparent and triangular in shape, pointing outwardly, and above this

in the next cell is another small square spot which is moved a little nearer the outer margin; in the apical inner space there are two small pin-point spots.

Hind wings: on the upper side the ground color is a shade lighter than on the fore wings, and on the inner space beginning at the apex and ending at the abdominal margin it is still another shade lighter; on the subapical space there is a well-defined grayish line about one-eighth of an inch long. Fringes brown, but lighter than the ground colour of both pairs of wings.

Under side: palpi, thorax and abdomen white; legs pale brown. On the fore wings the ground colour is the same as above, but a shade lighter. The apical area is suffused with a violaceous tint. All other markings are the same as above. On the hind wings the ground colour is white, with a pinkish cast; the nervures are pinkish brown.

Exp. male $1\frac{9}{16}$ inches. Type in cabinet of Ehrmann. Hab.: Suapure, Venezuela.

Pamphila Elenora, n. sp.—Upper side is dark brown, almost black. Fore wings have two small transparent marks in the limbal area; in the subapical space there are two very faint spots. Hind wings have a slightly lighter shading across the fascia. Fringes are scanty and black.

Under side: palpi, thorax and abdomen chocolate brown; the abdomen has two faint buff-coloured lateral bars. Legs light chestnut brown. On the fore wings the ground colour is the same as above, only a trifle lighter; there is a dash of yellow on the costa above the outer end of the discoidal cell. On the hind wings the ground colour is of a rich cinnamon brown; there is a narrow buff bar beginning on the costa near the apex and extending across the fascia to the submedian nervure.

Exp. $1\frac{7}{16}$ inches. Collected by E. A. Klages. Type in cabinet of Ehrmann. Hab.: Suapure, Venezuela.

Pamphila Theodora, n. sp.—Upper side: antennæ, head, thorax and abdomen brown. Both on the lower and upper side of the base of the antennæ on the head there is a conspicuous white spot; between the eyes is a sharp, well-defined white streak; the neck is of a buff colour.

Upper side of the fore wings: ground colour rich chestnut brown; there are two transparent spots in the lower area of the discoidal cell; the upper is triangular and the lower is quadrate in shape. The subapical area has a row of six elongate yellowish spots on the inner margin; from the base to the median area is a light brownish shade, above this is a well-defined golden-yellow spot.

Upper side of the hind wings: ground colour is a shade lighter than on the fore wings; running through the fascia from the apex to the abdominal margin is a row of seven golden elongated spots. Fringes light yellow.

Under side: palpi pale buff, thorax dark brown, abdomen dark brown, with two white lateral bars. The legs are chocolate brown. On the fore wings the ground colour is the same as above; costa light chestnut brown, tip of apex chestnut brown, the subapical spots that are on the upper side are reproduced on the under side by a broad white bar shaded at both ends with chestnut brown. The two transparent spots that are above are suffused into one irregular spot, and beneath this near the inner margin is a dirty whitish block. On the hind wings the ground colour is of a deep rich chocolate brown; there is a large pure white bar on the subcostal space; beginning at the base and ending at the apex there is a black dash in the discoidal cell; then there is another larger white bar beginning below the apex and extending across the fascia to the abdominal margin, and from the middle of the outer margin to the anal angle it is shaded with pale buff.

Exp. 1 4/5 inches. Type in cabinet of Ehrmann. Hab.: Suapure, Venezuela.

Thymele terracina, n. sp.—Female.—Upper side: the antennæ, palpi, head and abdomen are very dark brown. The thorax is dark brown, but clothed with a coat of long sage-green scales. On the fore wings the ground colour is dark brown; basal area dusted lightly with sage-green, at the outer end of the discoidal cell there is a large U-shaped transparent spot; above this spot on the costa there are two narrow elongated spots of the same colour. Below the discoidal cell in the limbal area there is almost a straight bar of three unequal-sized lunate transparent spots; on the apical inner space there is a curved line of six transparent spots, beginning on the costa and ending on the upper median vein. Fringes brown. On the hind wings the ground colour is dark brown; the basal area is heavily dusted with rich sage-green. Fringes pure white; from the apex of the anal angle to the base the fringes are brown.

Under side: palpi ashen gray, legs light brown; thorax and abdomen dark brown, thorax clothed with long blackish-brown hair-like scales. The fore wings are of a light chestnut brown, uniform throughout, transparent spots same as above. On the hind wings the ground colour is very

dark brown, costa a shade lighter, apex ashen-gray, between the median and the lower submedian vein there is a slight scattering of white scales. Tails $\frac{1}{2}$ inch in length.

Exp. $2\frac{5}{8}$ inches. Type in cabinet of Ehrmann. Hab.: Remedios, U. S. Columbia, S. A.

Thymele viterboana, n. sp.—Upper side: antennæ brown; head, thorax and abdomen olive-green. On the fore wings the ground colour is of a rich chestnut-brown, but grows a little lighter toward the base. The basal area is slightly sprinkled with bluish-green scales. The transparent spots are situated in a similar position to those in *T. harpagus*, Felder, but not so conspicuous. The fringes are brown. On the hind wings the ground colour is much darker than it is on the fore wings, the costa is lighter. The median space, beginning at the base of the wing and shading towards the tails, is a beautiful olive-green. Fringes brown, but dentated with white on the outer margin.

Under side: palpi buff; thorax, legs and abdomen dark brown. On the fore wings the ground colour is much lighter than it is above, but with a darker shade on the outer marginal space, the spots are all the same as above. On the hind wings the ground colour is dark brown, basal and costal area lighter, then running across the fascia and outer margin there are two lighter brown bars.

Tails, $3/16$ of an inch in length. Expanse of fore wings, $2\frac{1}{4}$ inches.

Hab.—Sacorro, U. S. Columbia, S. A. Type in cabinet of Ehrmann.

Thymele Guatemalaina, n. sp.—Male. Closely allied to the female of *T. proteus*, Linn., on the upper surface. The ground colour and spots are very similar, but the spots are not so distinctly separated. The basal area has a tendency to be lighter.

Under side: palpi fulvous; thorax and legs brown; abdomen ashen-gray. Fore wings light brown, inner margin still lighter; spots same as above. On the hind wings the ground colour is dark chestnut-brown; there is a narrow buff bar, $1/32$ of an inch wide, that begins on the costa near the apex, and extends to the lower median vein. All fringes are a shade lighter brown than the ground colour. Tails, $1/4$ of an inch long.

Expanse, 2 inches. Type in cabinet of Ehrmann. Hab.: Cajabon, Guatemala, Cen. Amer.

Thymele Thiemei, n. sp.—Upper side: antennæ, head, thorax and abdomen dusky brown. On both pair of wings the ground colour is dusky brown; tails dark, almost black brown; there is a very faint bar on the fascia of the fore wings. Fringes on all the wings light brown; on the tails black.

Under side : palpi, head, thorax, legs and abdomen light brown. On the fore wings the ground colour is light brown ; the fascial bar that is mentioned above is here very prominent ; the apical area has a large dark brown triangular spot. On the hind wings the ground colour is the same as on the fore wings ; the markings are the same as in *T. euryycles*, Lat., of Brazil. Fringes on both pairs of wings are a shade lighter than the ground colour. Tails, $\frac{3}{4}$ inch in length. Expanse, $1\frac{3}{8}$ inch. Hab.: San Pedro Sula, Honduras, Central America.

This species seems to be very rare, for of the many hundreds of specimens that I have obtained from Dr. C. Thieme, of Honduras, it remains unique in my collection.

Thymele Borja, n. sp.—Upper side : antennæ, head, thorax and abdomen are very dark brown. On both pairs of wings the ground colour is of a beautiful fawn-brown ; margins edged with dark brown ; fringes a shade lighter than the ground colour.

Under side : palpi light brown ; antennæ, thorax, legs and abdomen dark brown. Fore wings lighter than above ; transparent spots the same as above ; there are two dark wavy brown lines on the fascia. On the hind wings the ground colour has the same shade of brown as the fore wings ; on the costa near the base there is a quadrate spot ; aside from this there are two dark brown bars on the fascia. Tails, $7/16$ inch long. Expanse, 2 inches. Hab.: Barja, Bolivia, S. America.

Goniurus Triptolemus, n. sp.—Female. Upper side : antennæ, head, thorax and abdomen dark brown. On the fore wings the ground colour is also dark brown ; on the fascia there is a narrow transparent bar, which is composed of four unequal spots ; the third spot from the costa is the largest. In the median cell beyond this bar is a narrow transparent spot which crosses the cell ; on the subapical space is a row of four very minute transparent spots ; fringes brown. On the hind wings the ground colour is dark brown, but a shade lighter than the fore wings. The tails are white ; the vein that extends through them is sprinkled with brown. Apical fringes are white, but slightly intermixed with brown. Fringes on the outer margin and on the tails are very long and pure white. Abdominal fringes are shorter and brown.

Under side : the thorax and abdomen are much lighter than above ; the abdomen has a dark brown bar ; underneath the legs are also dark brown. On the fore wings the ground colour is lighter than above ; all the same markings, but the transparent bar is more sharply defined ; the inner margin is pale brown, and dusted with white. On the hind wings the ground colour is the same as the fore wings ; there is a faint dark

brown shading of three bars on the fascia ; outer margin from the apex to the tails is pure white ; tails are brown, heavily fringed with white. Tails, $3/16$ inch long. Expanse, $2\frac{1}{8}$ inches. Hab.: Bagasas, Costa Rica, Ct. America. Type Ehrmann collection.

Goniusurus Cleopatra, n. sp.—Female. Upper side : antennæ, head, thorax and abdomen are dark brown. On the fore wings the ground colour is dark brown ; the costa near the base to the transparent bar that extends across the fascia is white ; the bar that is on the fascia and the spots on the subapical space are the same as in *G. Triptolemus*; from the median cell the outer margin and tails are white; fringes white. On the abdominal margin the fringes are scanty and brown. On the hind wings the ground colour is dark brown ; the abdominal margin is dusted with white from the median vein, including the tails. Fringes on the apical and abdominal margin are dark brown.

Under side : palpi are white, dusted with brown; thorax and abdomen lighter than above ; there is a faint indication of two white lateral bars on the lower side of the abdomen ; legs dark brown. On the fore wings the ground colour is much lighter than the upper side ; the transparent bars and spots are the same ; the inner marginal area is white. On the hind wings the ground colour is very dark brown, slightly dusted with a lighter shade; outer margin, including the tails, is pure white excepting four faint lunate spots on the apical area. Tails, $1/16$ inch long. Expanse, $1\frac{5}{8}$ inch. Hab.: Suapure, Venezuela. Type in collection of Ehrmann. This species bears considerable resemblance to *G. Orion*, Cram., from the upper Cauca valley of Colombia, S. A., and was represented in the E. A. Klages catch by one fine example, excepting that one hind wing is missing; otherwise the specimen is perfect and fresh.

Eumesia Potomoni, n. sp.—Female. Upper side : antennæ black ; head, thorax and abdomen dark velvety-brown. On the fore wings the ground colour is a bronzy-brown. Base and margin slightly darker, and at the end of the discoidal cell there is a black dot. On the subapical space near the costa there are two minute transparent spots ; then below these dots there is a dark curved line ; this line ends in the lower submedian cell. The fringes are black. On the hind wings the ground colour is the same as that of the fore wings, but across the fascia are two dark brown bars ; the outer margin is faintly shaded with brown ; abdominal margin light brown ; fringes dark brown.

Under side : palpi and thorax are gray ; abdomen light brown. On both pairs of wings the ground colour is pale brown ; the markings are the same as above. Expanse, $1\frac{3}{4}$ inches. Hab.: Suapure, Venezuela. Type in collection of Ehrmann.

A NEW SAW-FLY OF THE GENUS XYELA.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

Xye'a negundinis, n. sp.—♀. Length 3 mm., or counting ovipositor, about 4; body entirely black; front dullish subsericeous; antennæ very dark brownish, the thick part a trifle longer than the filamentous; abdomen shining; ovipositor black; wings large, hyaline, iridescent, the large stigma and the nervures dilute sepia: venation agreeing with typical *Xyela*; femora black except the knees, which, with the tibiæ and tarsi, are dull ferruginous. Readily known by its black body and dark femora.

Hab.—Boulder, Colorado, April 10, 1907; collected by Mrs. Cora Bennett on flowers of *Acer negundo*. This is the third true *Xyela* from North America (cf. CANAD. ENTOM., Aug., 1902, p. 194).

A GALL-GNAT OF THE PRICKLY-PEAR CACTUS.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

Mr. E. Bethel, of Denver, in the course of his botanical excursions, has noticed that the prickly-pear cacti, *Opuntia*, sometimes bear large oval galls, containing Dipterous larvae. He recently collected some of these at Boulder, and was able to breed many of the flies, which prove to belong to an undescribed species.

Asphondylia Betheli, n. sp.

♂.—Expanse, 9 mm.; wings grayish-hyaline, with coarse hair; second longitudinal vein reaching tip of wing; third longitudinal forked near its middle; fold very distinct; head and thorax slate-gray; abdomen dark olivaceous gray, with copious pale hair; legs varying from pale yellowish to pale grayish; antennæ 2 + 12-jointed, the joints cylindrical, sessile, with coarse short hairs; measurements of joints in μ (3) 289, (4) 272, (12) 204, (13) 195, (14) 195.

Pupa about 5 mm. long; pupa-shell bright ferruginous.

Gall a swollen fruit of *Opuntia*, collapsing after the exit of the flies.

Hab.—Boulder, Colorado; flies emerging May, 1907.

Like other species of *Asphondylia*, this is not marked by any strong peculiarities in the adult state, unless it be the comparatively large size. It is closely related to *A. mentzeliae*, Ckll., which infests *Mentzelia* in New Mexico.

Mailed September 16th, 1907.

